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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/464,315	12/16/1999	TAN DU	TI-29436	7360

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EXAMINER

MAKHDOOM, SAMARINA

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/464,315

Applicant(s)

DU ET AL.

Examiner

Samarina Makhdoom

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 January 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-10, 12-16 and 18-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-10, 12-16, and 18-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 14 January 2003 is: a) ☒ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

Response to Amendment

1. Claims 6, 11, and 17 are canceled, and Claims 1-5, 7-10, 12-16, and 18-27 remain in the application.

Specification

2. Amendment to the specification is acknowledged and accepted. Objection to header in the specification is now withdrawn.

Drawings

3. The proposed drawings corrections were received on 1/14/03. These drawings are approved. Additionally, the drawing objection with respect to delay element is now withdrawn based on the applicant's cancellation of claims 6, 11 and 17.

Response to Arguments

4. Applicant's arguments filed 1/14/03 have been fully considered and they are persuasive with respect to 35 USC 112, first and second paragraph rejections; however, they are not persuasive with respect to 35 USC 103 rejection.

In the remarks, applicant argues in substance that Ebihara does not disclose (1) a circuit to create a magnetic field to oppose eddy currents established in structures adjacent to the coil by the driving current of claims 1, 7, 12, and 18; and (2) activating selected VCM coil driver transistors to create a magnetic field to oppose eddy currents established in structures adjacent to the coil by the driving circuit of claim 23.

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5. As to arguments (1) – (2), (1) See Col. 3, lines 8-51 for the distribution of magnets on the stator coils and the rotor to create a magnetic field to oppose eddy currents and control the head positioning circuit of the VCM. The method of controlling the magnetic flux disclosed by Ebihara opposes the eddy currents of the VCM. (2) The purpose of the VCM coil driver transistors is to create a magnetic field to oppose the eddy currents is allow for smooth movement of the head controlled by the VCM. Ebihara discloses in Col. 7, lines 14-20 that the stator mode of NiZn based ferrite prevents the eddy currents from flowing, which allows for the smooth movement of the head. The two circuit perform similar functions in the design of a VCM.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-5, 7-10, 12-16, and 18-27 are rejected under 35 U.S.C. 103 as being obvious by Ebihara et al. U.S. Patent No. 5,247,410 in view of Williams et al.

“Design and operation of a fully integrated BiC/DMOS head-actuator PIC computer hard-disk drives.”

Ebihara et al. teach a circuit to determine a velocity of a Voice Coil Motor to which a driving current is applied in a magnetic field, comprising:

a circuit to terminate the driving current in said coil; (Col 5, lines 29 et Seq for driving current)

a circuit to apply a current to said coil to create a magnetic field to oppose eddy currents established in structures adjacent said coil by said driving current; and (Col. 7, lines 14 et Seq)

Ebihara et al. teach a driving current is in a first direction in said coil, and wherein said circuit to apply a current to said coil applies a current in a direction opposite said first direction. (See Col. 6, lines 29 et Seq for driving current and opposite current)

Ebihara et al. teach a circuit to apply a current to said coil applies a current for a time directly related to a magnitude of the original current command after said driving current has been terminated. (See Col. 5, lines 29-37 where a prescribed drive current is applied once the disk reaches a prescribed speed)

Ebihara et al. teach a circuit to apply a current to said coil applies a current for a time directly related to a magnitude of said driving current prior to when said driving current has been terminated. (See Col. 5, lines 29-37 where a prescribed drive current is applied once the disk reach a prescribed speed)

Ebihara et al. teach a circuit to determine a voltage of a VCM coil after termination of a driving current in a first current direction in said coil, comprising:

a circuit for activating selected VCM coil driver transistors to apply a current to said coil in a direction opposite said first current direction to generate a magnetic field to oppose eddy currents established in structures adjacent said coil by said driving current. (See Col. 6, lines 10-34 where the secondary currents effect the drive current, and the secondary current flow in the opposite direction when the drive current is decreasing.)

Ebihara et al. teach a circuit for activating selected VCM coil driver transistors applies said current to said coil for a time directly related to a magnitude of the original current command after said driving current in said first direction has been terminated. (See Col. 5, lines 29-37 where a prescribed drive current is applied once the disk reach a prescribed speed)

Ebihara et al. teach a circuit for activating selected VCM coil driver transistors applies said current to said coil for a time directly related to a magnitude of said driving current prior to when said driving current has been terminated. (See Col. 5, lines 29-37 where a prescribed drive current is applied once the disk reach a prescribed speed)

Ebihara et al. teach a circuit for use in determining a velocity of a head assembly of a VCM after termination of a driving current in a coil of said VCM, comprising:

a circuit for activating selected VCM coil driver transistors to apply a current to said coil of said VCM to create a magnetic field that opposes eddy currents established in structures adjacent said coil by said driving current. (See Col. 6, lines 10-34 where the secondary currents effect the drive current, and the secondary current flow in the opposite direction when the drive current is decreasing.)

Ebihara et al. teach a circuit for activating selected VCM coil driver transistors applies a current to said coil in a direction opposite said first current direction. (See Col.

6, lines 10-34 where the secondary currents effect the drive current, and the secondary current flow in the opposite direction when the drive current is decreasing.)

Ebihara et al. do not expressly disclose the calculating the BEMF, flyback current, transistors, or the delay element.

Williams et al. teach calculating the BEMF of a head Actuator (See pages 1597-1598, Section D. Interval 4: Deceleration). The applicant's specification teaches that the head actuator and positioning circuits are part of the VCM (See Page 1, lines 8-13).

Williams et al. also teach the flyback current (See pages 1595-1596, Section C. Interval 3: Current Reversal) and the use of transistors (See Figure 2). Williams et al. also give details on terminating (or putting in an off-condition) the drive current, (See Pages 1591 last paragraph of right column that is continued on the next page.) As for the delay element, see Figure 1, on page 1591.

It would be obvious for one of ordinary skill in the art at the time the invention was made to modify the teaching of Ebihara et al. with the teachings of Williams et al. because it would result in a more accurate calculations of the electric current and magnetic force effects of the VCM. Ebihara et al invention relates to a head positioning system as part of a Voice Coil Motor for a magnetic disk drive Williams et al. invention relates to a head positioning system called a head actuator for a magnetic disk drive. Williams et al. teach the calculation of BEMF and flyback currents that are inherent to Ebihara's Voice Coil Motor. Williams et al also teach the use of transistors and delay elements that are inherent to control circuitry used for head positioning on magnetic disk drives.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samarina Makhdoom whose telephone number is 703-305-7209. The examiner can normally be reached on Part Time on Friday, and Sunday.

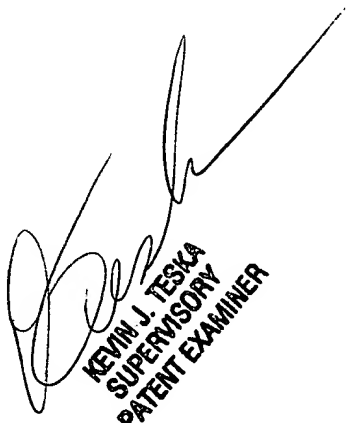
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J. Teska can be reached on 703-305-9704. The fax phone numbers for the organization where this application or proceeding is assigned are 703-305-0040 for regular communications and 703-305-0040 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

SM

February 15, 2003



KEVIN J. TESKA
SUPERVISORY
PATENT EXAMINER